



GEX DOC# 100-250

UV CONTROL AND MONITORING

GEX Recommended Procedure

Eff. Date: 07/27/07

Rev.: C

Pg. 1 of 3

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1.0 PURPOSE

B3 radiochromic film and GEX B3WINDose and DoseStix dosimeters manufactured with B3 film are sensitive to or influenced by exposure from light sources with spectral wavelengths of 340 nm and above. Because radiation doses are estimated based on the change in absorbance, dosimeters must therefore be protected from inadvertent exposure to normal daylight or UV lighting sources. Dose measurements made without sufficient protection from these sources of light may contain an unknown quantity of color change absorbance from indirect daylight or UV sources. This procedure describes instruction to implement protective measures and test methods to mitigate or sufficiently protect B3 film dosimeters from potential exposure to daylight and UV light sources.

2.0 MATERIALS

- 2.1 B3 Radiochromic film or GEX B3 WINDose or DoseStix dosimeters.
- 2.2 Genesys 20 spectrophotometer with dosimeter holder
- 2.4 UV protection material

3.0 FREQUENCY

- 3.1 After initial installation of UV protective measures
- 3.2 At determined intervals for monitoring effectiveness.
- 3.2 After filter replacement. (As necessary due to normal wear)

4.0 PROCEDURE

- 4.1 Obtain and apply UV protection filter material that can effectively shield ($\geq 99\%$) B3 radiochromic film dosimeters from daylight or UV light sources during pre and post irradiation handling as well as during the radiation process itself. If B3 DoseStix or WINDose dosimeters are irradiated in their factory sealed packages, it is not necessary to verify the pre-irradiation storage and handling areas nor the radiation process areas outside the irradiation zone as the dosimeter packaging itself protects the B3 dosimeters from daylight and UV sources.



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Pg. 2 of 3

- 4.2 Obtain unpackaged bare B3 radiochromic film dosimeters and measure and record their identification IDs and their optical absorbance values. Use a minimum of three replicates per dosimeter measurement location in order to determine an average, standard deviation and CV for each dosimeter location measurement set.
- 4.3 Place the dosimeter sets recording their specific locations and start times at sites where unpackaged and unprotected dosimeters are handled such as the dose measurement room, laboratory area or the dosimeter dose map preparation areas.
- 4.4 Retrieve, measure and record the absorbances of the dosimeters after they have been left open and exposed to the typical light sources they would see for the maximum time period in which B3 film dosimeters are expected to remain unprotected from potential light sources. This should include additional time where dosimeters would be exposed to light sources in the event a dosimeter would need to be re-measured or investigated after their initial measurement.
- 4.5 This test is repeated at least once per year to verify effectiveness of the light source protection.
- 4.6 Any UV protective films or sheeting in light fixtures or on windows may be replaced at predetermined intervals as part of a preventative maintenance program.

CAUTION: Verify that the light protective film material is not dislodged or moved from its original position following a change of light bulb or other maintenance activity that can affect the filter material location.

- 4.7 Analysis.
 - 4.7.1 Average each set of dosimeter measurements and compare the average against the prior or initial dosimeter set average.
 - 4.7.2 Successful qualification of the light protection effectiveness is observed when the unirradiated absorbance does not increase by more than 0.002 A.
 - 4.7.3 An acceptable level of time exposure is user dependent and a maximum limit for dosimeter exposure to the area UV conditions can be established if any rate per unit time is detected.
- 4.8 As a general practice, radiochromic dosimeters should not be exposed to light sources for longer time periods than are necessary for measurement. Dosimeters that will be left in the measurement area can be covered with paper or other light protective layer to prevent unnecessary exposure to light sources.



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Eff. Date: 07/27/07

Rev.: C

Pg. 3 of 3

5.0 REVISION HISTORY

Date	Revision	Change Description
07/27/07	C	Changed title of the document 3.2 modified language 4.5 added a defined frequency for effectiveness testing at 1 year minimum Added 4.6 to encourage proactive replacement of filter material and cautionary statement about changing of light bulbs and possible impacts 4.7.2 modified acceptance criteria language 4.7.3 modified statement to allow user to define acceptable time limits for the exposure of dosimeters if any increase is found and verified.